CLAIMS

1. The invention consists of a process for transmitting the positional coordinates of a viewing device during the acquisition of a sequence of video images while the viewing device is moving through space along a trajectory determined with respect to a defined reference point, characterized according to at least the following steps:

- A prelimary step consisting of attaching the said viewing device (10, 10') to a first subsystem (11, 11') which contains an inertial sensing unit delivering data signals representing the spatial coordinates and the instantaneous inclination of the said viewing device with respect to the said reference point;
- A first step involving the acquisition, in real time, of the said data signals during the movement of the said viewing device (10, 10') along the said trajectory (*t*) and their transmission to a second subsystem (12, 2) which includes equipment for processing these data (4) using a stored software program; and
- A second step consisting of processing the said data, either in real time or deferred for later analysis, so as to determine the said coordinates of position.

2. Furthermore, the invention includes a process, according to claim 1, wherein the said reference point (*XYZ*) is an orthonormal trihedron and the said coordinates represent the position of the said viewing device (10,10') along the said trajectory (*t*) in relation to the axes of the said trihedron of reference (*XYZ*) and the inclination data represents the angles of azimuth, elevation and roll around the axis of the said viesing device (10, 10'), the said axis intersecting the center (C) of the focal plane (FP) of the said images (I).

3. Furthermore, the invention includes a process, according to either of the preceding claims, wherein, during a supplementary preliminary step, the said second subsystem (12,2) is configured (51) in a manner conforming to the description of the characteristics of the components comprising the said

first (11, 11') and second (12,2) subsystems, including the characteristics of the said viewing device (10, 10') and of the software contained in the data processing unit (4) of the said second subsystem (12,2). In another supplementary preliminary step, the said inertial sensing unit (52) is initialized and standardized with respect to a reference point of origin.

4. Furthermore, the invention includes a process, according to either of the preceding claims, wherein, during a supplementary preliminary step, the said data signals, representing the positional coordinates and the instantaneous inclination of the said viewing device (10, 10') with respect to the said reference (*XYZ*), are synchronized (56). Another supplementary preliminary step involves the application of error corrections (53) to the said positional data streams delivered by the said inertial sensing unit. Another supplementary preliminary step involves further improving the quality of the said acquired data (55) by applying an image anaysis procedure, included among the software contained in the data processing unit (4). A final supplementary preliminary step consists of storing the said acquired data (57) within the hard drive data storage module (403) of the said data processing unit (4).

5. Furthermore, the invention includes a process, according to either of the preceding claims, for integrating the focal planes (*FP*) of images (*I*) obtained using the said viewing unit (10, 10') with the focal planes of images from other sources whose spatial coordinates are already known, by acquiring data identifying the focal length used by the said viewing unit (10, 10') and by capturing, in real time, data signals representing the spatial coordinates and the instantaneous inclination of the said viewing unit (10, 10') with respect to the said reference (*XYZ*), in order to determine the corresponding coordinates of the focal planes (*FP*) of the said images (*I*) within the said video sequence, the said coordinates of the focal plane (*FP*) of the image (*I*) being:

- the inclination of the said focal plane (*FP*) in space with respect to the said reference (*XYZ*), represented by the angles of elevation, azimuth and roll; and

- the position of the center (*C*) of the said plane (*FP*) of the image (*I*) with respect to the said reference point (*XYZ*).

6. Furthermore, the invention includes a process, according to either of the preceding claims, for navigating within a three-dimensional universe (59) involving a preexistant three-dimentional decor. The said process consists of the supplementary steps of acquisition and transmission to the said second subsystem (2, 12), in real time, of data representing the spatial coordinates and the instantaneous inclination of the said viewing unit (10, 10') with respect to the said reference point (*XYZ*), as well as the focal length used, as well as the images captured by the said viewing unit (10, 10') and the processing of the data signals and the images using software for three dimensional reconstitution, in a manner so as to visualize, in real time, an outline of the framing of the said viewing unit within the said preexisting three- dimensional virtual decor.

7. Furthermore, the invention includes a system for the transmission and processing of data representing the position in space of a viewing unit capturing a sequence of video images while moving in space along a trajectory determined with respect to a reference in order to implement the processes, according to claims 1 to 4, involving a first subsystem (11, 11') attached to a viewing unit (10, 10'), the said first subsystem (11, 11') comprising an inertial sensing unit delivering the said data signals representing the spatial coordinates and instantaneous inclination of the said viewing unit with respect to the said reference point (*XYZ*). In addition, the said system (1, 1') includes a second subsystem (2, 12) provided with the means to process these data according to a stored software program (4) and possessing a means for supplying electrical energy (400-401) to all or a part of the system (1, 1'). Finally, it is envisaged that the system will include connecting devices (112, 112') for transmitting the said signals from the first (11, 11') to the second subsystem (2, 12).

8. With respect to claim 7, the said viewing device (10, 10') is a video camera.

9. With respect to claims 7 or 8, the said inertial sensing unit includes at least one gyrometer and one accelerometer with three distinct, non-coplanar axes.

10. With respect to any of claims 7 to 9, in order to improve the determination of spatial coordinates of the said viewing device (10, 10'), to improve the synchronization between the said acquired data and the images (*I*) obtained, and/or to apply corrections to the said acquired data, the system will include at least one of the following components, housed within the viewing unit (10, 10'), the first subsystem (11, 11') or the second subsystem (2, 12):

- A tri-flux rotary magnetometer;
- Two inclinometers, orthogonal with respect to each other;
- A satellite localization device of the "GPS" type;
- An electronic localization device, using either electromagnetic or electrostatic fields;
- A magnetometer of one or several fluxes, either static or dynamic;
- An odometer;
- A temperature sensor;
- A precision quartz timer;
- An auxiliary video camera, attached to the said first subsystem, and/or
- A microphone (23).